

PATENT
10/725,326REMARKS

Claims 24 and 31-32 are now pending in the application. Claims 25-30 have been canceled. Independent Claim 24 has been amended herein. Claims 31-32 have been added. Claims 24 and 31 are independent.

Claims 24-25 and 28 were rejected under 35 USC 102(b) as being anticipated by US Patent 5,925,911 (Okabe et al.); Claims 24 and 28 were rejected under 35 USC 103(a) as being unpatentable over US Patent 5,674,766 (Darwish et al.); and Claims 26-27 and 29-30 were rejected as being unpatentable over Okabe and/or Darwish in view of US Patent 5,463, 241 (Kubo).

In view of the foregoing claim amendments and the following comments, each of the rejections is respectfully traversed and reconsideration is requested.

Independent Claim 24 has been amended to recite, among other limitations, the limitations of now canceled dependent Claim 18. Specifically Claim 24 now recites a method of forming a trench DMOS transistor device that includes "forming a *metal drain contact* that extends from an upper surface of the epitaxial layer *through the epitaxial layer, and into contact with the substrate*, the metal drain contact acting to *provide electrical contact with the substrate*, and "forming a metallic source contact adjacent an upper surface of the source region, and a metallic gate contact adjacent an upper surface of the conductive region in a termination region remote from the source region".

Applicant respectfully submits, in view of the foregoing amendments and discussion, that Okabe, Darwish and Kubo fail to teach, or even suggest, a DMOS device having each and every of the elements of amended independent Claim 24.

As noted in paragraph [0031] of Applicants' specification as filed, this embodiment "of the invention is shown in Fig. 2B, which incorporates a deep metal region, rather than a deep n+ region....in this embodiment, *the metal drain contact 218d is extended through the epitaxial layer 202 and into contact with the N+ substrate 200*".

PATENT
10/725,326

For at least this reason, independent Claim 24, as amended herein, is believed patentable over Okabe, Darwish and Kubo, taken separately or in any permissible combination, and reconsideration is respectfully requested.

Newly-submitted independent Claim 31 is directed to a method of forming a trench DMOS transistor device comprising the steps of providing a substrate of a first conductivity type, the substrate acting as a common drain region for the device, depositing an epitaxial layer of the first conductivity type over the substrate, the epitaxial layer having a lower majority carrier concentration than the substrate, forming a body region of a second conductivity type within an upper portion of the epitaxial layer, etching a trench extending into the epitaxial layer from an upper surface of the epitaxial layer, forming an insulating layer lining at least a portion of the trench, forming a conductive region within the trench adjacent the insulating layer, forming a low resistivity deep region extending into the device from an upper surface of the epitaxial layer, the deep region acting to provide electrical contact with the substrate, and, forming a source region of the first conductivity type within an upper portion of the body region and adjacent the trench, wherein the step of forming a source region also forms a region of first conductivity within the low resistivity deep region (emphasis added).

As recited at least in paragraph [0044] of Applicant's specification as filed, "n⁺ source regions 212 are formed in upper portions of the epitaxial layer in the cell region via an implantation and diffusion process...[a]t the same time n⁺ regions 212 are also formed in the area of the deep n⁺ region 219, which can improve subsequent contact resistance.....[t]he resulting structure is shown in Fig. 3D".


Newly-submitted independent Claim 31 is believed patentable over the art of record.

Dependent Claims 32 is believed to be clearly patentable for all of the reasons indicated above with respect to Claim 31, from which it depends, and even further distinguish over the cited references by reciting additional distinguishing limitations.

PATENT
10/725,326

Should the Examiner be of the view that an interview would expedite consideration of this Amendment, request is made that the Examiner telephone the Applicants' attorney at (908) 518-7700 in order that any outstanding issues be resolved.

Respectfully submitted,


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